CARNEGIE
Magazine

AT PITTSBURGH, PENNSYLVANIA

June 1932

Gold ornaments made by the Incas. Ornaments like these were seized by the conquistadors and shipped back to Spain. On exhibit at Carnegie Museum.

The Spanish Economy

Approximately 1479-1600 A.D.

The Spain of Columbus's time was powerful the world over. But the seeds that were to undermine this dominance were sown by Spain's exploitation of the New World.

With every Spanish conquest, the treasury grew richer in gold and silver . . . painfully extracted from Indian slaves laboring in America's abundant mines. It was Spain's plan, at first, to keep the gold within the country; and this short-sighted, economic policy led to continually rising prices.

Finally competition from lower-cost foreign goods sapped the strength of Spanish manufacturing enterprise until, at last, Spain's great power waned. In just one industry—textiles for example—3,000 silk looms flourished in the 1500's, but dropped to some 60 looms in 1655.

The detrimental effects of Spain's economic policy illustrate the advantages of our own free economy, in which our flexible monetary system and modern banking services help to promote the free flow of manufactured goods.

CARNEGIE INSTITUTE

4400 Forbes Street, Pittsburgh 13, Pennsylvania

Weekdays 10:00 a.m. to 5:00 p.m.; Sundays 2:00 to 6:00 p.m.

Cafeteria open for visitors to the building
Luncheon 11:00 a.m. to 2:00 p.m., weekdays
Snack Bar 2:00 to 5:00 p.m., daily

CARNEGIE LIBRARY OF PITTSBURGH

Weekdays 9:00 a.m. to 9:00 p.m.
Reference services until 10:00 p.m., weekdays
Sundays 2:00 to 6:00 p.m., reference services only

Institute and Library open to the public every day without charge
The entire building, however, closed July the Fourth

HYMN OF PITTSBURGH

My father was a mighty Vulcan;
I am Smith of the land and sea;
The cunning spirit of Tubal-Cain
Came with my marrow to me.
I think great thoughts, strong-winged with steel,
I coin vast iron acts,
And orb the impalpable dreams of seers
Into comely, lyric facts.

I am Monarch of all the Forges,
I have solved the riddle of fire,
The Amen of Nature to cry of Man,
Answers at my desire.
I search with the subtle soul of flame
The heart of the rocky Earth,
And hot from my anvils the prophecies
Of the miracle-years leap forth.

I am swart with the soots of my furnace,
I drip with the sweats of toil;
My fingers throttle the savage wastes,
I tear the curse from the soil.
I fling the bridges across the gulfs
That hold us from the To-Be,
And build the roads for the bannered march
Of crowned humanity.

—Richard Realf

In This Issue

AT PITTSBURGH, PENNSYLVANIA

This month's cover is a picture of tomorrow. It represents Liberty Avenue looking toward the new Point Bridge—a view long anticipated by farseeing Pittsburghers and now beginning to take shape in steel and concrete through a uniquely effective community partnership that is daily changing the face of the city.

The bridge vista was photographed from a three-dimensional model made by Louis Checkman through the courtesy of Equitable Life Assurance Company to show the final results of Point redevelopment as now planned. An eight- by ten-foot enlargement, the work of the Jay-Bee Studios, Pittsburgh, is on view in Sculpture Hall, rechristened "Triangle Hall" during the current civic-development exhibition, Pittsburgh Portrait. It is one of eight huge mural panels flanking a scale model of downtown Pittsburgh in the center of the hall.

Elsewhere in the exhibit are shown the genesis of community problems and the stages in their solution through the Pittsburgh formula for applied foresight. "Triangle Hall," where yesterday's dream becomes tomorrow's reality, brings the show to its climactic conclusion.

BEQUESTS—In making a will, money left to Carnegie Institute, Carnegie Institute of Technology, or Carnegie Library of Pittsburgh should be covered by the following phrase: I do hereby give and bequeath to (Carnegie Institute) or (Carnegie Institute of Technology) or (Carnegie Library of Pittsburgh) in the City of Pittsburgh, Pennsylvania ..... Dollars

MEMORIALS—Carnegie Institute is prepared to receive contributions given by friends in memory of deceased persons in lieu of floral tribute, and to notify the deceased's family of such gift. The amount of the contribution will not be specified unless requested by the donor.

CARNEGIE MAGAZINE, dedicated to literature, science, and art, is published monthly (except July and August) at 4400 Forbes Street, Pittsburgh 13, Pennsylvania, by Carnegie Institute, Carnegie Library, and Carnegie Institute of Technology. James M. Bovard, editor; Jeannette F. Seneff, editorial assistant; Florence A. Kemler, advertising manager. Telephone Mayflower 1-7300. Volume XXVI, Number 6. Permission to reprint articles will be granted on request. Copies regularly sent to members of Carnegie Institute Society. Subscription $2.00 a year. Single copies 25 cents.

Calendar for the Summer

EXPEDITION HALL

A new report from the field has been added to Expedition Hall, showing highlights of the Upper Ohio Valley Archeological Survey, the current study of Indian cultures in the tri-state area sponsored by the Sarah Mellon Scaife Foundation. Also on view are displays based on recent expeditions to Honduras for birds and to central Pennsylvania for fossil mammals.

PITTSBURGH PORTRAIT

Notable achievements in community planning may be seen in PITTSBURGH PORTRAIT, which, beginning this month, will be augmented by smaller-scale exhibits selected and recorded by the Pittsburgh Photographic Library at the University of Pittsburgh. The Children's Zoo is the subject for June, followed by Steel Production in July, and by a photographer's tour of the city in August.

VARIOUS MUSEUM EXHIBITS

Among the permanent exhibits, Botany Hall on the second floor makes an attractive way station for summer visitors en route from Dinosaur Hall on the ground floor to the new hall being completed on the third floor that deals with the ancient cultures of the Egyptians, Babylonians, and Persians.

SUNDAY ORGAN RECITALS

Marshall Bidwell's organ recitals in Music Hall, sponsored by the Arbuckle-Jamison Foundation, will be held at 4:00 P.M. each Sunday through June, then discontinued until October.

SURVEY OF CUT GLASS

More than two hundred pieces of cut glass are on display in Gallery I, third floor, until September 14. (See page 186.)

COLOR LITHOGRAPHS

Sixty prints selected from the SECOND INTERNATIONAL BIENNIAL OF CONTEMPORARY COLOR LITHOGRAPHY at the Cincinnati Art Museum may be seen on the balcony of Sculpture Hall from June 22 through July.

PERMANENT COLLECTION

Five new paintings are to be seen in the permanent collection, all recent gifts: *Self-Portrait* by Il Pordenone, *The Carter Refinery at Billings, Montana* by Joe Jones, *The Matador and His Assistants* by José Gutierrez Solana, *The Princess* by Gaston La Touche, and *Portrait of Artist and Wife* by Vincent Canadé.

AT THE LIBRARY

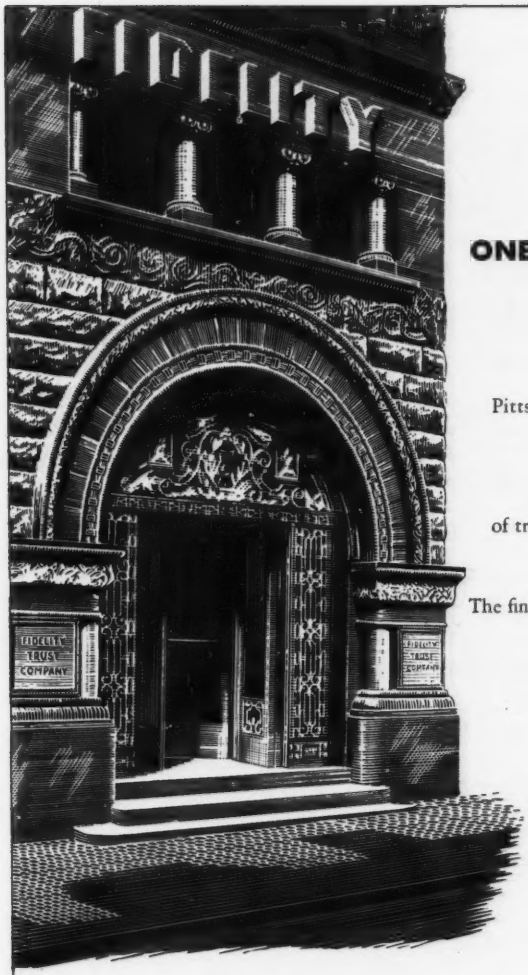
Summer story hour will he held in Central Boys and Girls Room Wednesdays at 2:30 P.M., during July and August.

A reading program is planned for teen-agers. Telephone the James Anderson Room for details.

CHILDREN'S CLASSES

Each Tuesday and Thursday morning during July a drawing class will meet at 9:30 o'clock. Any ten- to twelve-year-old who likes to draw is welcome.

Nature study class for six- to sixteen-year-olds will meet Mondays and Wednesdays at the Museum at 10:00 A.M., July 7 through the month.



ONE OF THE FOUR

Fidelity is one of the four trust companies between Pittsburgh and the Atlantic seaboard which have made the settlement of estates and the management of trust funds their principal business for more than sixty years. The financial well being of your family, through careful management of your estate, is the primary concern of these specialists.

IN PITTSBURGH
IT'S *Fidelity*

For full details about the specialized aid Fidelity offers, write for our new book, "For the Protection of Your Money and Your Family in a Fast-changing World."

FIDELITY TRUST COMPANY

343 FOURTH AVENUE. PITTSBURGH

A SURVEY OF CUT GLASS

DOROTHY DANIEL

THE idea that cut glass was the ideal wedding present did not originate with your grandma.

When Agamemnon's wife set out to buy a wedding present for her pretty sister Helena she could have selected fine glass, elegantly decorated by abrasion.

Legend had it that the personable Paris later wooed Mrs. Menelaus by making her presents of wheel-cut glass from over Nineveh way in Mesopotamia.

The Emperor Nero is recorded as having had at least one *vase diatreta* in his glass collection. And Pharaoh's daughter could very well have kept the ointments for the baby Moses in cut glass amphoras.

A SURVEY OF CUT GLASS is now on exhibition at Carnegie Institute.

Officially opened on May 8, this panorama of the art and craft of cutting was collected and arranged by Lowell Innes and E. R. Eller, Pittsburgh glass authorities. It contains over two hundred pieces of cut glass which will be on exhibition until September 14 to mirror man's uneven progress through the past fifteen hundred years.

An amber glass Roman drinking bowl from the fourth century is the earliest piece of glass on display. Loaned by Jerome Strauss from his internationally famous collection of drinking glasses, this bit of convivial equipment is decorated with parallel flutes and lotus-leaf design. Both motifs have been much used to decorate glass from the time of the Caesars to the days of the Democrats. By coincidence one of the latest pieces in the survey is also flute cut—a contemporary lead crystal vase made by a former Pittsburgh manufacturer, The United States Glass Company, now of Tiffin, Ohio.

Although the blowpipe was not invented until the first century A.D., core-wound and molded glass had been made for some fifteen hundred years before the birth of Christ, and simple engraved patterns have been found from the fourteenth century B.C. Excavated glass frequently has a patina or incrustation that adds to its beauty. The cosmetic jar from the Strauss collection is a good example of this gradual decay in glass which leaves fragile laminae of iridescence on the surface. This particular small jar, probably designed to hold a fashionable Egyptian lady's "mascara," is remarkable for the relief decoration that distinguishes it from the others in the case. The pattern itself is raised, the background cut away, probably through the use of a "free-wheel," an engraver's tool employed by ancient glass cutters, which looks and acts much like a dentist's drill.

Early Roman and Egyptian cutting instruments were ingenious. Even with the advantages of electricity, we have never quite mastered the technique of cutting cameo glass as the Romans did it. Many of our own copper-wheel engravings are exquisite. Examples of fine pictorial engraving are to be seen in the seventeenth- and eighteenth-century European drinking glasses on loan from the Strauss collections. American cutters, however, have in the relatively short period of one hundred and seventy-five years that encompasses our own glass history confined their skills al-

---

Mrs. Daniel is the author of *Cut and Engraved Glass 1771-1905* published by Barrows & Co., two years ago, the only American book on this subject. In the autumn she will be lecturing on glass in Texas and the Southwest, and a second text on glass is under way.

Her three-act play, *Remember Me*, was produced at the Pittsburgh Playhouse in 1949, and a musical on the communal experiment at Old Economy, Pennsylvania, with which she has collaborated with Kenneth Welch, is scheduled for the new Craft Avenue Theatre of the Playhouse this fall. At present she is working with Billy Gilbert on the book for a Broadway musical dealing with life among the Eskimos at the time of the Alaska purchase.

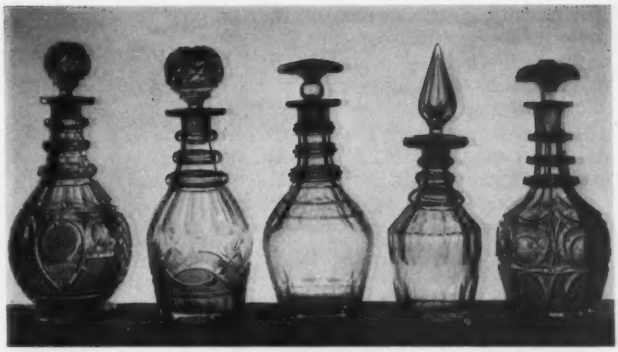
A native of Iowa, Mrs. Daniel grew up in Sioux City and attended Simpson College. In 1927 she became a writer for *Chicago Daily News* and two years later an announcer for National Broadcasting Company. Mrs. Daniel came to Pittsburgh in 1933 and was woman's editor of the *Sun-Telegraph* for six years.

most entirely to the use of large stone wheels on which watered sand is the abrasive for cutting, and small copper wheels fed with oil and pumice for fine engraving.

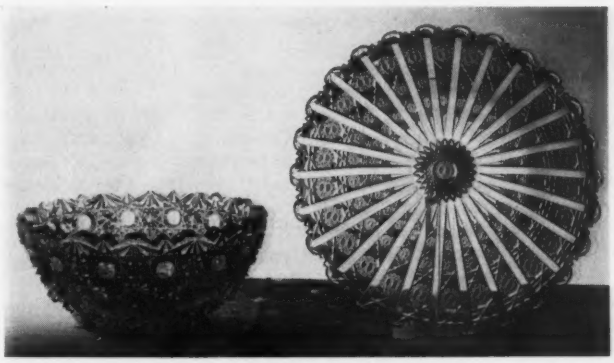
Egyptian and Roman glassmakers impressed slaves into service to turn the flywheel for the cutting lathe. It is said that these hostages, many of whom were Hebrews in captivity, thus learned the jealously guarded techniques of the glass industry and carried knowledge of the craft into far lands, a fact that further complicates attribution of ancient glass.

Among the early or ancient glass pieces in the present survey is a bottle cut in partitioned design, three vertical bands of leaf cutting, alternating with two bands of broken scroll (Egyptian ninth-tenth century). Its direct descendants, made almost a thousand years later, are to be found in the Irish glass from the Henry Oliver Rea collection and the fine examples of early Pittsburgh glass attributed to B. Bakewell and Company (1827).

Plates of all ages are rare because they are harder to make than bottles or tumblers and they are more easily broken than bowls or stemmed ware.



CUT-GLASS DECANTERS THAT SHOW THE PROGRESSION OF DESIGN AND CUTTING THROUGH THE NINETEENTH CENTURY IN AMERICA



BOWL MADE FOR THE COLUMBIAN EXPOSITION AT CHICAGO IN 1893. PLATE (12″) CUT FOR PARIS EXPOSITION, 1889, BY T. G. HAWKES.

ENGRAVED GOBLETS WITH CUT STEMS AND A CUT COVERED POKAL. EARLY EIGHTEENTH-CENTURY BOHEMIA. STRAUSS COLLECTION.

But in the present SURVEY OF CUT GLASS there are a number of cut-glass plates, the earliest of which is a 10-inch Egyptian plate cut with a thumbprint border and a circle-in-square geometric base design. This plate is from the collection of Colonel Ray W. Smith, one of the foremost collectors of ancient glass in the world. Now on government service in Berlin, Colonel Smith arranged for five pieces of his fine early cut glass to be sent to Pittsburgh from the Metropolitan Museum, where a portion of the extensive Smith collection is on loan.

A Bakewell plate from about 1827 is also on exhibition. Formerly in the collection of Mrs. Douglas Stewart, it was presented by Mrs. Stewart to the Historical Society of Western Pennsylvania, who loaned this and several other rare pieces to the present exhibition.

A later plate comes from the collection of Samuel Hawkes, who, with his father, Thomas G. Hawkes of Waterford, Ireland, and Frederick Carder, an English glass workman, built and founded the original Steuben glass works in Corning, New York, in 1903. The 12-inch plate is on display in the hall case. It is cut in the Grecian pattern, which was one of two cut-glass patterns to win first prize for T. G. Hawkes and Company at the Paris Exposition in 1889. This was the first time American cut glass had been recognized—much less honored—by continental glass experts.

In point of time, the Brandenburg goblet from the Strauss collection follows the ancient glass. A V-shaped goblet (1690) with wheel-cut knopf, it was being used at royal banquets in Europe a good fifty years before Paul Revere was old enough to saddle a horse. Other prized pieces of European glass also from the Strauss collection include a Russian goblet engraved with a portrait of Elizabeth I (1750) and a covered pokal from the Riesengebirge district of Silesia. (1720).

English-Irish glass is well represented with a boat-shaped, swag-cut compote from the Rea collection, and a covered urn—English probably—which for many years graced the Tudor dining room of the late Mrs. Henry R. Rea in Sewickley.

Since cut glass was one of Pittsburgh's first industries and since Pittsburgh was one of the nation's first glass centers, it is fitting and proper that several early glass companies should be represented in the present collection. Never before has such a comprehensive and complete exhibit of early Bakewell cut glass been assembled. Florence Kline, Charles Willetts, Robert Rodgers, Charles McClintock, Mr. and Mrs. W. M. Guthrie, Mrs. William R. Crittenden, and Robert Carew, prominent glass collectors, have loaned their prize pieces to the exhibition. There are a number of compotes, decanters, wine glasses, tumblers and one kettledrum salad bowl, as well as pitchers large and small, cut in the English strawberry-diamond motif so dear to the heart of our early American glass cutters of English birth and heritage.

NINTH-CENTURY CUT-GLASS PLATE (10") PROBABLY EGYPTIAN AND EXTREMELY RARE

The vesica pattern and the later partitioned cuttings are both represented in the Bakewell glass. A tumbler, in the bottom of which is a sulphide head of Marquis de Lafayette, belongs to Dr. Kline and is another rare Bakewell piece, probably made to commemorate Lafayette's visit to Pittsburgh in 1825.

Two glass companies of Wheeling, West Virginia—Ritchie and Wheat (John and Craig Ritchie), and M. and R. H. Sweeney—specialized in glass of clear lead metal of exceptional brilliance. Later some of these pieces were overcut and engraved, but at the time of their most prolific manu-

[*Turn to page 191*]

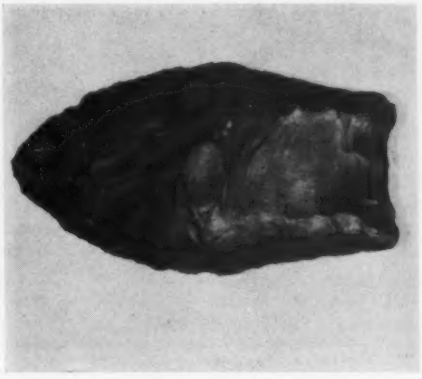
A CENTRAL AMERICAN CLUE TO EARLY MAN

WILLIAM J. MAYER-OAKES

THE business of sending expeditions off to unknown areas of the globe is standard museum practice. A recent "expedition," however, traveled no farther than the dark corners of Room 13, the archeology laboratory recently converted from a storeroom. One of the finds discovered there in a musty packing case had a unique and significant bearing on the story of man's development in the New World. It was a distinctive fluted spear point of the type found in 1926 at Folsom, New Mexico, in association with the bones of an extinct bison. Since the original Folsom discovery this type has been recorded from much of North America, but until the Carnegie Museum find never south of the United States.

In many fields of science, advancement and change is so great that early discoveries must be re-examined in the light of more recent knowledge. Sometimes the results are indeed startling, as they were in this case.

The Upper Ohio Valley Archeological Survey was organized in 1950 as the first step in a program of renewed anthropological activity. In order to facilitate this work various archeological collections were gathered in Room 13, and one—the large Costa Rican collection—was unpacked and placed on open storage.



FOLSOMOID FLUTED SPEAR POINT (actual size) FROM COSTA RICA, IN MUSEUM COLLECTION

John Simpson, now assistant archeologist, unpacked and moved this collection. Among other things in the collection he noticed this particular spear point and brought it to me for identification. The point was recognized as a unique item, coming from an area where none of this type had previously been found. The Costa Rican collection had been brought from Costa Rica in 1904 by C. V. Hartman, curator of archeology from 1903 to 1907. It was catalogued shortly thereafter, but most of it was immediately repacked and remained in storage until 1950.

In such a collection, composed mostly of ornate pottery vessels, jade carvings, and stone idols, this spearhead was inconspicuous and almost unexpected. Hartman, however, had procured several other less spectacular stone and flint items to round out the collection, little knowing that twenty-two years later excavations in New Mexico would prove this special type of spear point to be the earliest known for the New World! Subsequent excavations in the high plains of the United States have fully corroborated the age of this type of

OLDEST PYRAMID KNOWN (1500 B.C.) IN THE NEW WORLD, AT CUICUILCO, MEXICO. IT REPRESENTS AN ADVANCED CULTURE, BUT WHAT PRECEDED IT IS A MYSTERY.

point. Until 1950, however, none had been known to come from any area south of the Rio Grande.

The implications of this find are far-reaching and may prove highly significant, since the Folsom people of North America are presumed to have been the first men established in the New World. By use of the radiocarbon technique their culture has been shown to date from at least 8,000 B.C. At approximately this same time, man was living at the southern end of South America, where radiocarbon dates for Chilean cave remains demonstrate the presence of men as contemporaries of the extinct horse and ground sloth earlier than 6,500 B.C. Other early cultures have been found on the coasts of Peru and Chile. In Central America, on the other hand, the earliest cultures known are well-developed agricultural communities (such as that of Cuicuilco in central Mexico) with no apparent predecessors.

In recent years, however, several clues have been found which indicate that pre-agricultural hunting cultures were present in Central America. These basic complexes have been overshadowed by the great civilizations which developed out of them and became the famous Aztec and Maya cultures of recent times. Understandably enough, archeologists have neglected to look for camp sites and other signs of early occupation, concentrating instead on the jungle-hidden cities with their pyramids, temples, and hieroglyphic writing.

In 1947, Helmut de Terra uncovered a fragmentary human skeleton in an ancient lake bed in the central valley of Mexico. Because of the indirect association of these bones with geological and paleontological

MR. MAYER-OAKES, archeologist in the Section of Man, has been organizing and conducting research into early Indian history in this area during the past two years since he joined the Museum staff. The project, known as the Upper Ohio Archeological Survey, is sponsored by the Sarah Mellon Scaife Foundation.

Earlier he had headed the University of Chicago excavations in northern Illinois, studying remains of the earliest Indians known in that state. The thesis for his master's degree at the University was based on this study. The summer of 1948 he spent excavating for Smithsonian Institution in eastern Oklahoma, and in February and March, 1951, he and Mrs. Mayer-Oakes traveled in Mexico, photographing archeological sites.

He is a member of various archeological and anthropological societies, a director of the West Virginia Archeological Society, and counselor for the archeological division of the Waynesburg College Academy of Arts and Sciences.

features, the skeleton was thought to represent an individual who had lived at the close of the last Ice Age, about 10,000 years ago. Criticism of the technique used in making this find leaves reasonable doubt in the minds of many archeologists about the accuracy of the estimate. If de Terra's interpretation is valid, however, the Tepexpan skeleton is the oldest known from the New World.

De Terra also suggested that certain early hunting cultures were present in central Mexico. Although an intensive search for man in association with Ice Age animals has never been made in Central America, the accumulation of scattered items of evidence in recent years indicates that such a project would probably be successful in proving the existence of Early Man in this area.

While none of the Mexican evidence indicates a direct connection with North America, the Costa Rican fluted point definitely signifies such a relationship. Fluted points are well known and have been found widely distributed in North America but nowhere else in the world. Thus the finding of one in Central America is a valid clue to human migration routes. At the moment we can only theorize that the first men entered Alaska from Asia perhaps twelve to fifteen thousand years ago. As wandering hunters they moved southward with the game. Developing their distinctive spear point until it became the accepted style, some of them continued the journey south, eventually reaching the southern tip of South America. Along the way, various groups split off and stayed behind. Some in Central America continued to make the fluted-style points, while those known from South America did not. In most areas of the New World these earliest hunting groups were the basic culture-population from which later local developments emerged.

The magnificent collection which Hartman brought to Pittsburgh has been only partially studied. Hartman himself began the work and published a *Carnegie Museum Memoir* on his own excavations and some of the stone objects of the "Las Guacas" culture. He returned to his native Sweden before the job was done, however, and so the study of the major part of the collection, the ceramics, metal, shell, and bone, has never been accomplished.

With research in local archeology well under way, it should be possible to expand the activities of the Section of Man in the direction of Central America. The analysis and publication of the unworked Hartman collection would be a major contribution, and following up the lead on Early Man could be the most important archeological work since the original Folsom find!

A SURVEY OF CUT GLASS

[*Continued from page 188*]

facture they were panel and flute cut. These are well represented in the present glass survey with loans from the Oglebay Museum near Wheeling.

Lura Watkins, foremost authority on New England and Cambridge glass, has loaned several examples of glass from the Boston district. And from Carnegie Institute's own collection have come some late-nineteenth-century Bohemian pieces in the standard red and yellow overlays engraved with the common hunting scenes.

Probably the most spectacular case in the exhibition hall contains just two pieces, the Mulvaney and Ledlie compote with panel cutting and amethyst overlay rim loaned by Mrs. Lida Snowden Henesey, and the amethyst cut pitcher loaned by Mrs. Dorothy Lee Jones, of Newton Center, Massachusetts.

The chronological order of the survey, from the exhibit of ancient Roman and Egyptian glass to the case in which typical examples of commercial and mechanically manufactured imitations of cut glass are shown, provides a progressive study of glass form, metal, and decorative techniques rarely available for comparison.

The student of man may follow his fellow creatures—their ideals, morals, ingenuity, and talents—back almost to the beginning of the Christian era, through the two hundred pieces of glass represented. Cutting, or decoration by abrasion, forms the only single point of reference through the entire history of glass—even before the recorded history of man.

It is through exhibitions and collections such as this that our American culture is at last delineating its accomplishments and tracing through its ancient antecedents, its mixed and mighty heritages.

WINDOWS . . .

SYMBOLS OF CULTURE

For many, many centuries man existed in structures without windows.

We ask ourselves why? The answer is simple—there was no glass for windows.

It was not until about the 12th Century that glass was used in windows to any appreciable extent. Glass was a rare and costly material. In many countries today, window glass is still a luxury which only the rich can afford.

During the 18th Century windows came into their own. The large bay window was widely used in England. This provided a room with a view and reflected the high level of culture of the 18th century.

The glass window became the subject of literary and historical writers. Some called it a symbol of cultural development. They pointed out that the glass window made it possible to open mankind's dwellings and minds to the wonders and beauty of nature.

Just as the glass window signifies cultural progress so does the name Pittsburgh Plate Glass Company signify superior quality in glass for home glazing.

MUSEUM SUMMER PLANS

UNSOLVED mysteries close to home will engage most of the Museum staff this summer, both afield and in the laboratory.

According to William J. Mayer-Oakes, who is in charge of field work for the Upper Ohio Valley Archeological Survey, the big question mark on the summer schedule is the Allegheny Valley, where some collecting has been done in the past but almost none in recent years. The Ohio Valley, on the other hand, offers definite promise of valuable discoveries. Elsewhere the majority of the sites excavated have revealed only one level of occupation. Around Beaver and Steubenville in particular, however, the Survey expects to find New World versions of what Schliemann unearthed in his search for ancient Troy—a succession of cultures on a single site, in this case probably representing the oldest continuous occupation in the entire Survey area.

The results of five years' field work completed last June will keep staff mammalogists within doors all summer, preparing for the final phase of the Survey of Pennsylvania Mammals. Certain key groups have been singled out for special intensive study because of the unprecedented wealth of material obtained since 1946. These studies will be chiefly concerned with the nature, extent, and causes of variation within one generation—a problem that has presented great difficulties in the past because the relatively small number of specimens available made it impossible to distinguish between individual and group variations. John E. Guilday is applying this "microscope on evolution" to the short-tailed shrew *Blarina*, while Dana Snyder studies the meadow mouse *Microtus*. Analyses of both genera will be completed early this summer and written up for incorporation in the forthcoming book on Pennsylvania mammals.

The Pennsylvania Herpetological Survey will concentrate on field work in areas still inadequately represented in the collection. Chief among these is the central part of the state—a little-known region which, in its complexity of alternating mountain ridges and valleys, offers a number of interesting problems in the distribution of reptiles and amphibians.

Museum botanists and entomologists will also devote much of the season to local collecting. Leroy K. Henry and Werner W. Buker plan to continue their Saturday visits to Bedford and the other southern counties bordering on West Virginia in the hope of extending the known range of certain plant species. Similar work will be done along the Ohio border as far north as Erie, and summer flora will be collected in Indiana and Jefferson counties. The section of insects and spiders will concentrate on lepidoptera as Harry Clench, assistant curator, collects butterflies in Allegheny County for the revised checklist he plans to publish later this year.

A summer in the laboratory, broken only by short field trips, is on the schedule for Juan José Parodiz, who came to the Museum from Argentina last January. As assistant curator of recent invertebrates his immediate concern is to study the existing collections and discover the blind spots in preparation for future field work. Indoor stocktaking may be suspended for a few days, however, in favor of the annual meeting of the American Malacological Union in Cambridge, Massachusetts, in August.

Studies of the Honduran bird specimens obtained during recent expeditions have indicated that it would be advisable to make another collecting trip in the dry months of April, May, and June. In the meantime, Arthur C. Twomey hopes to resume his field studies of the Audubon warbler and the myrtle warbler in Alberta and northwestern Montana, where the overlapping habitats of these two species have resulted in hybridization. Roland W. Hawkins plans to collect in Pennsylvania during the summer, while W. E. Clyde Todd continues his laboratory work on the birds of the Labrador Peninsula.

E. R. Eller is still on the trail of those stubbornly elusive creatures, the unknown ancestors of the Coal Age invertebrates. This year the search takes him to Ohio,

[*Turn to page 213*]

From Our PERMANENT COLLECTION

STUDIO OF THE OLD MASTER
By Vaughn Flannery
(1898-)

THE painting, *Studio of the Old Master* by Vaughn Flannery, has been returned to the permanent collection. It was one of the forty-two canvases from the Carnegie Institute collection that were lent to the Columbus Gallery of Fine Arts in exchange for seventy-nine paintings from the Howald collection shown at the Institute from February 28 though April 13.

Studio of the Old Master is a favorite with visitors to the Institute, especially with followers of the race track and sportsmen in general. The title may suggest that the picture is concerned with an artist, but in this instance, the horse is of another color! The scene is the living room of the cottage of James E. Fitzsimmons, now seventy-seven, affectionately dubbed "Mr. Fitz" and "Sunny Jim" by his friends and nicknamed by turf writers "the Old Master"—which accounts at once for the title of the canvas. The cottage was located in the back stretch at the Aqueduct Race Track on Long Island. It was torn down four years ago. In the room, its walls covered with prints and photographs of famous horses, the Old Master is seated at a long table and reported to be looking over a condition book and at the same time making uncomplimentary remarks about racing secretaries. "Fish" (George Tappan), assistant trainer, warms himself by the stove and does all of Mr. Fitz' official worrying, and the son John, Mr. Fitz' business manager, takes care of the bookkeeping at the old secretary, which was the "office" of the establishment.

The description of the room, its contents, and especially its habitués might indicate that the painter was attempting character studies, but *Studio of the Old Master* is essentially the portrait of a room. It is a room in which the great and small of the racing world gathered. As someone wrote: "It is a room familiar to the President of the Jockey Club, former Secretary

of the United States Treasury, distinguished racing officials, famous breeders, as well as a great many people who simply loved horses and enjoyed Mr. Fitz' hospitality. To this room too have come the down-and-out jockey looking for a meal, the old-time horseman looking for a bargain horse with which to get through the coming season, as well as many old-timers of the American turf who simply wanted to warm themselves by the stove and talk of old times."

VAUGHN FLANNERY

Studio of the Old Master is painted almost as if in haste, so that its intimacy, warmth, homeyness, and comfortable feeling would not disappear in the doing process. The three figures are sketched in, but it is certain that no visitor to the place familiar with the occupants would fail to recognize them. Vaughn Flannery, with the technique and colors he used on this canvas, created an atmosphere which fairly oozes out to meet the beholder and gives to him the same impression as actually came to the frequenters of the cottage. Brown tones predominate in the canvas, particularly on the walls and in the draperies. Bright colors are introduced in the rug and in the wearing apparel—coats and sweaters and a polka-dot jockey's jacket carelessly flung on the couch and chairs. Additional color notes are introduced through the racing forms and magazines on the table.

The painting is oil on canvas, 28 inches in height by 40 in width. It is signed at the lower right of center, "Vaughn Flannery." It is not dated, but it was painted in 1940 and was entered in the SURVEY OF AMERICAN PAINTING at Carnegie Institute that year. It was purchased out of the show through the Patrons Art Fund for the permanent collection of Carnegie Institute. It has been lent for many exhibitions, the last before Columbus being PAINTINGS OF THE AMERICAN RACING SCENE BY VAUGHN FLANNERY at the Kraushaar Galleries in 1951.

It will be noted that Vaughn Flannery is referred to as a "painter." That is because his attitude towards his pictures is unpretentious: "I'm not trying to be an artist or anything like that. You get an awful lot of precious implications when a painter wants to be called an artist." Henry McBride, the critic, observed that Vaughn Flannery is not a "limner of horses" but a painter who turns to racing more frequently than to any other subject. In addition to his art interest and many other activities—as, for instance, he publishes a country newspaper—Vaughn Flannery is a breeder of Thoroughbreds. He lives and works at Cockade Farms in Harford County, Maryland, where he and Mrs. Flannery raise yearlings for Thoroughbred sales. The historic Cockade Farms were built by English Quakers in 1794. The buildings are of fieldstone of Maryland Colonial design. The studio is a remodeled slave cabin originally built for house servants. His own Thoroughbreds are models for many of his paintings.

Vaughn Flannery began to exhibit in Carnegie Internationals in 1930 and has been represented in practically every Founder's Day exhibition since that time. In 1946 he served on the jury of award for PAINTING IN THE UNITED STATES. In the 1950 PITTSBURGH INTERNATIONAL he was represented by *The Chestnut Stallion, "Discovery"*, lent for the exhibition by Alfred G. Vanderbilt. —J. O'C., JR.

CONSERVATION MILESTONE

A LIVING museum of primeval western Pennsylvania has just been acquired by Western Pennsylvania Conservancy. Appropriately this 25-acre tract in Butler County, containing one of the largest stands of the Blazing Star or Gayfeather (*Liatris spicata*) in this part of the country has been designated as the Jennings' Blazing Star Prairie to honor O. E. Jennings, director emeritus of Carnegie Museum.

Butler Garden Club, aided by Oak Hills Garden Club, Town and Country Garden Club, Butler High School Conservation Club, and individuals and firms in Butler and Slippery Rock, raised approximately $2,000, which has been matched by the Conservancy, a group working for preservation of areas of geologic, biologic, scenic, or historic interest.

OUR ENGINEERING HERITAGE

FREDERIC T. MAVIS

THE year 1952 is being widely publicized as the centennial of engineering in the United States. One hundred years ago the American Society of Civil Engineers was founded, and it is today the oldest national engineering society in America. The centennial will be marked with some ceremony even if engineers are too busy nowadays to take much time out for a jubilee. Yet it is a good time to reflect on what engineering is, what engineers do, how engineers prepare themselves to do their work, and where that work may lead.

ORIGINS IN ANCIENT TIMES: Engineering in its broadest terms is the art of directing the great sources of power in nature for the use and convenience of man. It is an art as old as civilization itself because men have always had to wrestle with the power of nature. It is certain that civilized man practiced irrigation and a crude art of surveying from earliest times, and that he understood much more of the world about him than we are likely to give him credit for. I shall not discuss the structures, monuments, hydraulic works of the Egyptians and Babylonians; the architecture of the Greeks; the roads, bridges, buildings, aqueducts, baths, and water laws of the Romans; the specifications and contracting procedures of antiquity. I shall not speculate on the knowledge ancient engineers had of rollers, levers, pulleys, and inclined planes; of the theory of arches as well as of the practice of building them to be useful and beautiful for more than two thousand years; of the science of mechanics and its application to arts of peace and war; of geometry and astronomy; of logic, and the mind tracks of induction and deduction; of law to govern rulers and those they ruled; of rhetoric and the art of persuasion; of music and art and sculpture; of the education and training of youth. Yet all these bear significantly on the advancement of civilization—and with it civil engineering. Who today can expect to have his works live two thousand years from now? Yet that is exactly what is happening to the works of Archimedes in mechanics; of Euclid in geometry; of Vitruvius in building construction and engineering education; of Frontinus in water supply and law.

The Romans reached front rank among civilized peoples about the first century A.D., and the end of their decline is usually marked by the burning of Rome near the end of the fifth century. The decline was a gradual process involving "bread and circuses"—more "bread" following more "circuses" in a dizzy spiral. People were unable or unwilling to see the inevitable dangers of political programs that give away "benefits" and take away personal rights and self-respect—and people and politicians coasted to destruction. The fall of Rome was brought about more by the fiddling of Nero and his predecessors than by the actual burning of the city of Rome!

ADVANCEMENT IN MEDIEVAL TIMES: Western Europe fell apart after Rome lost its lead, and a thousand years passed before a widespread revival of cultural progress was ushered in by the invention of printing in the fifteenth century. But this thousand years was not wholly dark. The monks made great efforts to keep civilization alive. One mendicant order, Brothers of the Bridge, built and maintained roads, bridges, and wayside shelters. "Ingeniators" or master builders were in great demand to build private homes for the nobles and to make and operate engines of war. The name "engineer" came into being for ingenious men who did engineering work. I need only to mention such names as Roger Bacon, John of Salisbury, Abelard, to suggest that science and education were not dead in the twelfth century either. Great changes were taking place with action of the Crusades counteracted by the knowledge that followed them back out of the East. Gunpowder had been invented and its use in war sounded death to the medieval castle. One common

soldier with firearms was more than a match for many nobles in heavy armor!

A great revival of art and learning started in Italy, and it soon spread beyond the Alps. The mariner's compass was invented—and with it came new courage to explore more unknown worlds. A science of mechanics was firmly grounded—and with it came new courage to explore more of the world's unknown. Indeed, when Galileo was born in 1564 (about fifty years after Leonardo da Vinci died) the world was more than half medieval—and when he died in 1642 (the year Newton was born) the world was more than half modern. Good books were being printed and widely disseminated. The minds of men were as great as they have been in any age—and once they were free to think, they thought great thoughts that brought some of the greatest advances in all time. At the end of the medieval period the old art of casting bells and cannon was reborn as the art of making machinery and metal cylinders. The modern world was being born—and among engineers and scientists who helped with the delivery are such men as Copernicus, Leonardo da Vinci, Stevinus, Galileo, Huygens, Newton, Pascal, Vauban.

Progress in Modern Times: Before the eighteenth century, training for engineering was by apprenticeship. If you can get the right masters and apprentices together there is no better method; but it is not geared to handle large numbers of students. Schools for engineers grew out of the need for more well-trained men than the apprentice system could provide. It was the French who led in the development of engineering as an art-science in schools of higher learning, and other Europeans and Americans soon followed their lead.

Perronet, engineer to Louis XV of France, was given the job of building a system of national highways. Realizing the importance of good technical training, he transformed his staff into a school of men working together in 1747, and this school was legalized and officially named the École des Ponts et Chaussées in 1775. Because of this, Perronet is sometimes called the father of engineering education.

1760-1852

Great economic and political changes were taking place in France and America in the late eighteenth century. Equally great changes were taking place in engineering—in manufacturing, transportation, commerce, and agriculture. The spinning jenny and steam engine were invented and later the cotton gin. The industrial age had begun. A new shingle appeared in the professional world: John Smeaton, "civil engineer," had coined a new adjective to distinguish one branch of the engineering profession from another. Two famous technical schools were founded in the latter part of the eighteenth century: the Bergakademie at Freiberg in Saxony in 1766 and the École Polytechnique at Paris in 1794. Even so, engineers in England were trained by apprenticeship for many years.

In the early 1800s power was applied to transportation, and all industry in Europe and America advanced rapidly. More technical schools were needed to train men who could lead and guide mechanized industry. In 1802 the United States Military Academy was established at West Point—modeled after the École Polytechnique. It was the first school of applied science in any English-speaking country. Other schools began engineering training: Polytechnic Institute of Vienna, 1815; Norwich, 1819; Royal Polytechnic of Berlin, 1821; Rensselaer, 1824; University College, London, 1840; and Harvard, 1847.

Formal engineering education now had taken firm root—even if it was highly mathematical and dealt largely with theory. Leadership was being transferred from continental schools to the United States. It is in our own country that we find real progress in formal engineering education during the next hundred years beginning in 1852.

1852-59

In 1851 the first international exhibit was held in London. Industrial products from many countries were displayed and

---

Dr. Mavis has been professor and head of the department of civil engineering at Carnegie Institute of Technology since 1944. Previously he had served on the faculty of Pennsylvania State College and the State University of Iowa. A graduate of the University of Illinois, he took his doctorate at Illinois in 1935.

He is a member of numerous engineering societies and honorary fraternities and is the author of *The Construction of Nomographic Charts* (1939).

there was increased interest in technology. The American Society of Civil Engineers was founded in 1852, and engineering education went forward rapidly. After Yale added engineering to its program of study in 1852 and Michigan in 1853, there were six schools of engineering in America—and all of them are active today.

B. F. Greene, director of Rensselaer, studied methods and programs of engineering education in Europe and reorganized work at Rensselaer. In 1855 he published as his director's report, *The True Idea of a Polytechnic Institute*—a classic that merits study today. It is natural, he wrote, to question the utility of such studies as rhetoric and philosophy to technical men when the time spent in formal engineering education is so short. Yet there should be balancing elements in a course necessarily so materialistic. No studies, he reasoned, are more suitable than these [rhetoric and philosophy] for developing the mind and they should find a prominent place in the educational program of every polytechnic institution. Renssalaer was thus firmly established as a technical university and was influential in shaping engineering education in America.

1860-79

In 1862—midway in the War Between the States—the First Morrill Act granted land for colleges of agriculture and mechanic arts. The number of publicly supported schools grew and each one that received land grants included engineering in its programs. Many private schools followed this lead. In the ten years before 1862 the number of engineering schools had grown from four to seven or eight, and by 1870 to seventeen. After the close of the Franco-Prussian War in 1871 there was increased activity in science and technology in Europe and this was reflected in the United States. The number of engineering schools had increased to 70 by 1872.

In a paper on "The Education of Civil Engineers," T. C. Clarke told members of A.S.C.E. in 1874 that the educational program should stress learning general principles in the schools and acquiring technical knowledge in practice. This was a highly controversial issue among engineers in the 1870s. A. L. Holley argued the other side in a paper on "The Inadequate Union of Engineering and Science" read before the February 1876 meeting of The American Institute of Mining Engineers (founded in 1871). Engineering schools were laying too much emphasis on abstract principles, he argued; and he advised putting the actual practice first and the theoretical study later. Debate was brief but sharp, and the issue was referred to a committee to continue the discussion at a joint meeting of A.S.C.E. and A.I.M.E. at the Centennial Exposition at Philadelphia in June 1876.

Twenty-five engineers, prominent in education and practice, took part in this two-day discussion at Philadelphia. The consensus was that education to prepare real engineers must be broad—stressing essential underlying principles and a considerable range of so-called cultural studies. Practical training was also necessary early in the professional life of the engineer.

1880-99

The Exposition of 1876 in Philadelphia was the first in the United States, and it stimulated widespread interest in science and engineering. It is not surprising then that the number of schools which taught engineering increased to 85 by 1880.

The Second Morrill Act of 1890 provided further support for colleges of agriculture and mechanic arts. When the World's Columbian Exposition was held in Chicago in 1893, engineering was taught in more than one hundred schools, and interest in engineering was still growing. The Society for the Promotion of Engineering Education was organized under the chairmanship of Ira O. Baker, professor of civil engineering at the University of Illinois, as Section E of the World's Engineering Congress. Papers at that meeting were presented by men inspired—indeed it is a humbling experience to reread Volume One of *Engineering Education*, dated 1893.

1900-1919

In 1907 the Society for the Promotion of Engineering Education invited the "Founder Societies" in engineering and the American Chemical Society to appoint delegates to a joint meeting to report on the appropriate scope of engineering education and on the degree of co-operation and unity that might be advantageously arranged between engineering schools. The Carnegie Foundation for the Advancement of Teaching and the General Education

Board were invited to appoint delegates the next year. The members of national technical societies, asked to express their opinions of the essential characteristics of an engineer, rated them in the following order of importance: 1. Character, integrity, resourcefulness, initiative. 2. Judgment, common sense, scientific attitude, perspective. 3. Efficiency, thoroughness, accuracy, industry. 4. Understanding of men, executive ability. 5. Knowledge of fundamentals. 6. Technique of practice and business.

C. R. Mann said in 1917 that the division of time in the 125 schools studied was 20 per cent to the humanities, 30 per cent to mathematics and basic science, and roughly 50 per cent to technical work.

By 1918 Dr. Mann's investigation was completed and his final report, *A study of Engineering Education*, was published by the Carnegie Foundation for the Advancement of Teaching.

1920-39

In 1922 the Council of S.P.E.E. proposed that another investigation be made of the objects of engineering education and the adequateness of the curriculum. Carnegie funds, and others, were granted. W. E. Wickenden was named director of the investigation and H. P. Hammond, associate director in charge of relations with engineering colleges. Many organizations and faculty committees helped in securing data and submitting reports.

The two-volume *Report of the Investigation of Engineering Education, 1923-29* reached four main conclusions: 1. An undergraduate course should be a co-ordinated program of three stems of subject matter: science, engineering methods, and social relations. The last year should be focused upon the students' major subject. 2. The three stems of engineering education should be unified into one branch with unity of administration. 3. An undergraduate course should be four years in length. 4. A graduate should continue his development either by formal graduate study in a school or by individual study after he enters practice.

The Wickenden-Hammond reports guided engineering education through the postwar years of the 1920s and the depression of the 1930s. When he was president of S.P.E.E. in 1933, W. E. Wickenden said that during the ten years of the Investigation engineers had acquired an envied position among college teachers. A sense of unrest and uncertainty had given way to a sense of assurance. These were the happy fruits of the Board's wise policy of promoting a program of stimulation, rather than one of standardization.

But engineering, which had given birth to many industries, was itself feeling the pains of growth and social pressure during the 1930s. Engineering education had to examine itself again in its social and economic surroundings of the early 1940s. Charles F. Scott may well have set the stage for a new appraisal when he wrote: "What are the causes leading to new trends? . . . Our environment—the world about us—is changing. The science which engineers apply is expanding. . . . Development of engineering education depends upon the willingness and ability for adaptation to changing environment. . . . Is it to be . . . education via the scientific, engineering route, or specific engineering via the educational ladder?"

1940-52

H. P. Hammond was chairman of the S.P.E.E. Committee on Aims and Scope of Engineering Curricula which published its report in 1940. The committee stated that the flexible four-year undergraduate curriculum, followed by graduate work, would meet needs better than a longer undergraduate curriculum; that the undergraduate curricula should be made broader and more fundamental through increased emphasis on basic sciences and humanistic and social studies; that there were advantages in the parallel development of the scientific-technical and the humanistic-social sequences of the engineering curricula; that the integrated program which extends throughout the entire undergraduate period should therefore be preserved.

Soon after the Hammond report was published the United States was a participant in World War II, and every engineer—student, teacher, and practitioner—was buffeted by crises, hullabaloo, and an avalanche of directives. Engineering educators were bedeviled by changing winds. What lay ahead? What might be the pattern of engineering education after the war? Robert E. Doherty, then president of Car-

[*Turn to page 213*]

CHANGING WATER INTO LAND. That's what happened when this Northerly Island Airport was built on Chicago's lake front, only a few minutes from the Loop. By sinking steel sheet piling, made by U. S. Steel, into the lake bottom, and filling the enclosure thus made with sand dredged from the lake, runways were created on which planes can land conveniently close to the city's business district. Only steel can do so many jobs so well.

USS

UNITED STATES STEEL

THE WRECK BY WINSLOW HOMER
First painting purchased for the permanent collection of the Institute

THE PITTSBURGH INTERNATIONAL

Continued from last month

JOHN O'CONNOR, JR.
Associate director of fine arts, Carnegie Institute

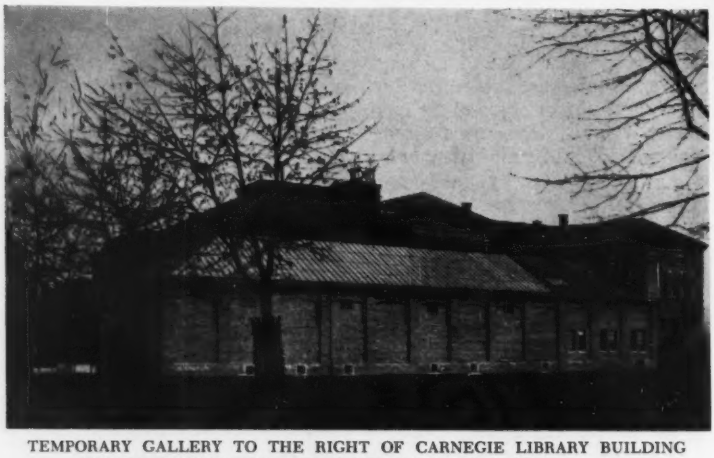
For the Eighth Annual Exhibition at Carnegie Institute in 1903 it was decided to depart in a measure from the plan pursued during the first six and to limit invitations to contribute to American artists residing in America; and in conjunction with the paintings thus assembled to present a collection of works, contributed as a collection, by members of the International Society of Sculptors, Painters and Gravers of London. Under this plan only American painters were eligible for honors and the jury was made up of artists from the United States. The Medal of the First Class under these arrangements was awarded to Frank W. Benson for his painting, *A Woman Reading*.

The Ninth International was conducted on the old plan. For it 760 works were submitted, of which 324 were accepted. That there should be no interruption in the annuals, a temporary gallery to the right of the Carnegie Library was erected under a grant from Andrew Carnegie while the building was being enlarged. This enlargement was being carried out principally to afford sufficient space for the rapidly expanding Museum and to give the Department of Fine Arts adequate gallery space for the Internationals. The Ninth and Tenth Internationals were held in the temporary building, the erection of which is some indication of the donor's great interest in the International. This structure was torn down, re-erected, and is still standing as the Field House of Washington Playground on Bedford Avenue overlooking Bigelow Boulevard. The exhibition for 1906 was abandoned owing to the pressure of work preparatory to the opening of the new building in April 1907.

The new and spacious galleries of the greatly enlarged Carnegie Institute building were inaugurated by the Eleventh In-

ternational. It marked the high watermark of the Institute's efforts thus far. There were 515 works contributed by 365 artists; of the paintings, 321 came from abroad. This exhibition was visited by over 342,000 people in the nine weeks it was open. The First Prize was awarded to Gaston La Touche for his painting, *The Bath*. It was purchased out of the exhibition by Robert C. Hall and later went into the collection of the late William S. Stimmel. It now hangs in the University Club, Pittsburgh, as a loan from the W. S. Stimmel Estate. Second Prize in 1907 was awarded to Thomas Eakins for his *Portrait of Professor Leslie Miller*. It is important in the history of the International to remember that this was the first recognition the artist received. Of this painting Robert Henri wrote: "Look, if you will, at the portrait of Miller for a man's feeling for a man. This is what I call a beautiful portrait; not a pretty or a swagger portrait, but an honest, respectful, appreciative, man-to-man portrait." Eakins was receiving recognition in Pittsburgh when it could be said, "This is the Philadelphian whom Philadelphians have never thought it worth while to honor." The story is told that when John Singer Sargent was visiting in Philadelphia

THE BATH BY GASTON LA TOUCHE
First Prize in the 1907 International



TEMPORARY GALLERY TO THE RIGHT OF CARNEGIE LIBRARY BUILDING
WHICH HOUSED THE INTERNATIONALS FROM 1904 TO 1907
DURING THE RECONSTRUCTION OF CARNEGIE INSTITUTE

in the early nineteen hundreds, his socially prominent hostess decided to give a dinner in his honor. But whom should she invite? "Eakins," suggested Sargent. "Eakins?" repeated his hostess, "but who is Eakins?" Philadelphia has made amends. Struthers Burt in his volume *Philadelphia*,

PORTRAIT OF PROFESSOR LESLIE MILLER
By Thomas Eakins
Second Prize in the 1907 International

Holy Experiment calls the roll of Philadelphia artists and ends with "the greatest of them all, the really great Thomas Eakins." How great? And what is his position among American artists? Well, this question was answered by Walt Whitman in a conversation about Eakins with Horace Traubel. "It is hard to make or justify comparisons of great men: stars differ in glory: who shall say one star is eminent beyond the rest of the stars? But we have an instinct in the matter—you have yours, I have mine. Shall we quarrel about the stars?"

For the Twelfth International a very interesting innovation, which was followed in many of the succeeding Internationals, was introduced. It was a one-man show. Twenty-two paintings by Winslow Homer were grouped in a gallery. This was an appropriate tribute to a great American artist who had been awarded the Chronological Medal in the First International for his painting entitled *The Wreck*, which, by the way, was the first painting purchased for the permanent collection of Carnegie Institute. The one-man gallery in 1909 was occupied by twenty-five canvases by Sir Alfred East, who served a number of times on the jury of award. It was a delicate tribute to Pittsburgh on the part of the artist that two of the paintings were local scenes. This Thirteenth International also contained a group of seventeen paintings by the American landscape painter, Henry Ward Ranger. The First Prize in 1909 was awarded to Edmund C. Tarbell for *Girl Crocheting*. A number of notable paintings from this exhibition were purchased by the Fine Arts Committee. Among them were *Portrait of Mrs. Chase* by William M. Chase, *Spring Morning* by Childe Hassam, *Judgment of Paris* by Emile René Ménard, *Munich Boy* by J. Frank Currier, and *November Hills* by Bruce Crane. As indicated, the various International exhibitions have afforded the Institute an excellent opportunity to cull paintings for the permanent collection. It will be recalled that this was one of the stated purposes of the annual show.

For the one-man exhibition in the Fourteenth International, Childe Hassam contributed thirty-eight of his works. In this exhibition William Orpen took First Prize with his *Portrait of the Artist*, originally entitled *Venus and Me*, which is now one of the possessions of the Institute. In the 1911 International First Prize went to John W. Alexander, an artist born in Pittsburgh and the painter of the mural decorations in Carnegie Institute. In 1911 and the following three years the one-man gallery was held successively by J. Alden Weir, John Lavery, Lucien Simon, and Paul Dougherty. In each of these exhibitions the

European representation was notably strong, but it remained for the Eighteenth to take on the most international aspect thus far. Out of the total of 342 works, 179 were foreign, representing 13 European countries. All the European paintings from this exhibition were on the high seas when the first World War broke out in August 1914. They were held in storage at Carnegie Institute under the Alien Property Custodian until the close of the war. In view of the art exhibition at San Francisco, as part of the Panama-Pacific Exposition, the Fine Arts Committee decided to omit an International in 1915, and then because of World War I the exhibition was not resumed until 1920.

The Nineteenth International was a memorable one in many ways. In a large measure through the enthusiasm, knowledge, taste, and energy of the late Robert B. Harshe, the then assistant director of fine arts and afterward director of the Art Institute of Chicago, who went to Europe to renew the interest of European contributors, an excellent representation of current painting was secured. Out of a total of 373 works, 187 came from abroad from 12 nations. Ménard contributed 22 canvases for a one-man show. A large number of European paintings in the exhibition were sold, for which the low rate of European exchange was in a way responsible. Included in this show was a group of thirteen small bronzes by Rodin, four of which were purchased for the Institute. First Prize was awarded to Abbot Thayer for his painting, *Young Woman in Olive Plush*.

The exhibitions discussed so far contained, with few exceptions, the names of the great contemporary painters. Of the pioneering work of Carnegie Institute in introducing to America outstanding figures in European art, Christian Brinton wrote long ago: "It must never be forgotten that Pittsburgh enjoys the distinction of having introduced Segantini to America, that it was the first organization to extend welcome to Cottet, Blanche, Ménard, Simon, and many others of the Société Nouvelle, that the Englishmen, Shannon and Nicholson, the Irishmen, Lavery and Orpen, the Glasgow School, and the modern Germans, Scandinavians, and Russians each found their first regular transatlantic representation on the same walls."

This may be the time and place to discuss once and for all the cost of the International and then go on to more important considerations. It has been indicated that the First Annual Exhibition cost approximately $7,000 and the second about $12,000. John W. Beatty, the director of fine arts, in his Fifth Annual Report, March 31, 1901, wrote: "Since the public demands and the Board approves the annual exhibition, the heavy expense occasioned thereby should not be permitted to almost wholly prevent the carrying on of the exceedingly important work of founding permanent collections. Many opportunities to acquire works of

PORTRAIT OF THE ARTIST BY SIR WILLIAM ORPEN
First Prize in the 1910 International

ELEANOR, JEAN, AND ANNA BY GEORGE BELLOWS
First Prize in the 1922 International

great merit have already been lost to the Institute because of the meager amount remaining to the Department's credit after meeting the expense of the annual exhibition, and in some cases values of paintings offered have greatly enhanced within the past twelve months."

Mr. Beatty was voicing, or rather outlining, early in the history of the International, a criticism that caused reactions on the Board of Trustees when much later, in 1920, for the Nineteenth International, the net cost came to over $47,000. The result was an attempt to reduce the expenses for the next two years which was, in turn, reflected in the quality and quantity of the shows. For one thing, no one was sent to Europe to select the canvases in 1921. While the total number of paintings in the 1921 International was slightly larger than in 1920, the increase was all in the American section, and only eight European countries were represented instead of twelve. W. Elmer Schofield, an American painter who was living in England, acted as the Carnegie Institute representative in Great Britain, and André Dauchez, an artist, in France. The cost of the 1921 International was about $38,000. Since the jury of award was made up of ten artists for the last time, it might be well to record their names: George W. Bellows, Emil Carlsen, Charles W. Hawthorne, and Robert W. Vonnoh of New York; George Clausen and William Nicholson of London, England; Leonard Ochtman of Cos Cob, Connecticut; Charles W. Woodbury of Boston, all of blessed memory; and Daniel Garber of Philadelphia and Edward W. Redfield of Center Bridge, Pennsylvania, who, we are happy to relate, are with us.

Further economies were instituted for the ensuing International. Homer Saint-Gaudens was appointed assistant director in July 1921, and he went to Europe for the first time for Carnegie Institute in the interests of the 1922 International. The big change in the plan of organization was the jury. Instead of having ten artists elected by the contributors to the exhibition, a jury of four painters, two Americans and two Europeans, was appointed by the Fine Arts Committee. The American members were Charles Woodbury and Charles C. Curran, and the Europeans were Laura Knight and Lucien Simon. Director Beatty presided at the meeting of the jury of award in Pittsburgh. As another point in the economy program, the total number of paintings was reduced and each contributor limited to one canvas. The paintings were hung in national groups for the first time, and this plan was so successful that it was continued through the 1950 International. There were 178 paintings in the American section and 119 in the European section gathered from eight countries. First Prize in the 1922 International went to George Bellows for his painting, *Eleanor, Jean, and Anna*. Emile René Ménard

took Second Prize and Henri Lebasque, Third. All the Honorable Mentions went to Americans. The economies introduced brought the total cost of the International down to $29,692.

To continue and to end the discussion of the financial side of the International, the cost rose from the 1922 figure until the 1931 International reached $58,000. In the meantime, the 1927 International was only made possible by a generous grant of $50,000 from Andrew W. and Richard B. Mellon. This amount permitted the International to continue until 1932, in the Depression period, when the show was omitted for the first time because of lack of funds. The show was resumed the next year on a reduced budget, and the cost was lowered to $25,000. It began to rise again until the expense of the 1937 and 1938 shows was about $40,000 each. The last International before the war came to $35,000, and the 1950 exhibition, which was resumed through the grant of The A. W. Mellon Educational and Charitable Trust, cost $65,000. That there was something in Homer Saint-Gaudens' contention that the importance of the International was related to the amount of money expended and, he always added, "the effort put into the show" is demonstrated by the 1931 International, which cost $58,000. There were 496 paintings in the show from 16 nations. The attendance was 161,747, 5 per cent of the paintings were sold and 10,246 catalogues. These figures have never been equaled and neither has the expense, except in the 1950 International. The cost of that show—the 1950 Pittsburgh International—may be accounted for through the tremendous increase in all costs since the 1931 exhibition.

It has been pointed out on occasions that if all the money invested in the Internationals had been devoted to the permanent collection, the said collection at Carnegie Institute would be a very notable one, especially if the funds were expended for contemporary paintings. On the other hand, through the years the prestige of Carnegie Institute and Pittsburgh has been enhanced, as in no other way, through the Internationals.

[*To be continued*]

GHIBERTI'S EAST DOORS
1452-1952

SISTER M. IMMACULATE, S.N.D.

Those who love the fine arts and those who love the Bible may enjoy their own quiet celebration of the quincentennial of the famed East Doors of Lorenzo Ghiberti by visiting the plaster reproduction in the Hall of Architecture, first floor of Carnegie Institute, with this article as guide. The full-size reproduction of the Florentine masterpiece, recently gilded and highlighted, recalls Michelangelo's words, "worthy to stand at the gates of Paradise."

BRONZE did not fetter the thinking hands of Lorenzo Ghiberti (1378-1455). This the East Doors of the San Giovanni Baptistery at Florence have revealed for the past five hundred years.

The Baptistery of San Giovanni was the first edifice of importance erected in Florence. It was formerly the cathedral. An authenticated tradition makes it once a temple of Mars.[1] Its location is opposite the Campanile and west of the Cathedral of Santa Maria del Fiore. In form an octagon, it is surmounted by a cupola and lantern. The cupola is hidden beneath a pyramidal roof. Externally it is covered with black and white marble.

Within, the baptistery is ornamented with sixteen columns, placed in niches in pairs. The vault is covered with a mosaic. It represents the Savior in the act of benediction, surrounded by angels. Above the entrance to the tribune is a colossal figure of the Redeemer, sitting in judgment, and representations of the resurrection, heaven, and hell; there are also scenes of the creation, the deluge, the history of Joseph, and incidents in the life of Christ. Below is the history of John the Baptist, a patron saint of Florence.

Andrea Pisano's pair of doors, set up in 1336, when the baptistery still served as cathedral, held the place of honor at the east entrance for nearly a hundred years; now they serve at the south. They have twenty-eight compartments in Gothic quatrefoils. The sculpture in low relief is attached to the Gothic formula of the Pisan school but avoids its mannerisms, thanks to the influence of Giotto.[2] Twenty of the panels have scenes from the life of John the Baptist; the remaining eight, at the bottom of the doors, contain allegorical figures.

The north doors, Ghiberti's first portals (1403-24), are based upon the prototype of Pisano. The upper twenty compartments depict the life of Christ; the eight lower, the evangelists and the Latin Fathers. These portals were in the eastern doorway from 1424 until the completion of his second pair in 1452. The figures are more slender and more complex than Pisano's. There are comparatively few figures, and the accessories of setting are simple. For Pisano's decorative border with accents of lions' heads, Ghiberti substituted a delicate motif of ivy with accents of human heads copied from classical models or drawn from actuality.

The East Doors (1425-52), ordered by the guild of cloth-merchants, are Ghiberti's masterpiece.

The dimensions are the same as his first pair: 18′ 6″ x 12′; without the frame: 15′ x 8′ 3″. His original plan provided for twenty-eight panels. The change to ten much larger rectangular panels afforded him a better opportunity for pictorial perspective. Each of the ten plaques measures 31 x 31″.

Katharine Gibson gives a clear explanation of the "lost wax" process whereby in all probability the panels for the doors were made.[3]

First the panel was modeled in clay somewhat roughly. A layer of wax of the thickness the bronze was desired to be, was put over the clay. The carefully molded wax was covered by a paste of pounded brick, ashes, and clay mixed with water. More clay was packed on the outside as a further protection for the work within, and the whole was bound with iron to keep each part in place. When the mold of clay, brick, and ashes was baked in a furnace, the wax was melted away. Into

the hollow space where the wax had been, liquid bronze was poured. Although the casting in bronze was a time of great anxiety for the sculptor, it was a small part of his task. For he had to know how to tell his story, where to place his figures, what lines to use—all this before he would begin to work in clay and wax. Years of practice in modeling and bronze casting were required to enable the goldsmith to follow quickly and well the command of his brain. The wax process enabled the goldsmith to have greater depth in his relief than was possible in ancient times when the bronze was hammered into shape.

The Panels

In his East Doors the inspired hands of Ghiberti caused bronze to be historied with Old Testament scenes and figures. The subjects are as follows:

At the left	*At the right*
1. Adam and Eve	2. Cain and Abel
3. Noah	4. Abraham
5. Esau and Jacob	6. Joseph
7. Moses	8. Joshua and Jericho
9. David and Goliath	10. Solomon

The great problem of Ghiberti was how to achieve spatial depth. By an interplay of light and shadow, by linear and aerial perspective, by freeing the foreground figures and making the background recede, he created the effect of spatial illusion.

Purists have objected to his pictorial treatment of bronze. Through the many figures, the significant landscapes, the perspective, the vanishing backgrounds, his reliefs become paintings. His achievement, however, was so transcendant, that he has had many followers.[4]

The full effect of his reliefs is not gained from a distance. His doors call for a close inspection. And so, one might question whether or not this is the proper attitude of mind for a maker of doors since one should not be arrested by so much story in passing through an entrance.[5]

Still, it is only through contemplation of the skillfully disposed figures, born of thinking hands, that we can imbibe the religious feeling of the reliefs—in these doors there is poetry begetting tranquillity.

Therein we read the history of Israel, the great events that affected the Jewish history in a mighty way. We contemplate the serene pictures of patriarchal life and also the more darkly shadowed dramas from Adam to Solomon.

Adam and Eve

The first panel, the highest of the left wing, presents to our view the creation of Adam and Eve, the fall, and the expulsion: four episodes and forty figures—each person and countenance is distinct. At the lower left-hand corner, the Almighty touches Adam into human consciousness. In the middle of the composition, Eve rises to meet the Creator. Just born, she is a study in balance of repose and activity.[6] Vertical lines are on both sides; on the one side, the trees of the garden where Adam and Eve are failing; on the other, the gate whence they are expelled. Above the whole the angel group hovers and melts away into the infinity of the sky. The winged spirits and the multiple halo of the Creator furnish the graceful, curved lines.

The relief is highest in the rugged mass at the bottom of the panel. Here the body of Adam is partly in the round. Gradually the relief becomes lower until the last of the angels merge by a sixteenth of an inch from the bronze background.[7] The perspective is perfect.

Cain and Abel

The second panel, the highest at the right, unfolds the story of Cain and Abel. They are represented as little children in the company of Adam and Eve. Another scene represents Cain ploughing the earth; the oxen that draw the plough are realistic both in form and movement. In Abel the shepherd we have a symbol of the life of contemplation; he is seated and with his dog keeps watch. Realism is evident in the fatal club still held by Cain when he hears the curse of the Creator.

Noah

Realism and gracefulness are also in evidence in the panel devoted to Noah and his family, the ark, and the vineyard. Noah asleep near a barrel still holds the cup that was too strong. The wings of the birds, the curled-up trunk of the elephant, the antlers of the deer, the tail of the lion, the circular barrels, one and all, indicate Ghiberti's predilection for gracefulness of curves.

Abraham

The influence of the contemporary naturalistic movement is observed in the

EAST DOORS OF THE SAN GIOVANNI BAPTISTERY BY LORENZO GHIBERTI

fourth panel which presents the unified scenes of Abraham welcoming the three travelers, Sarah at the door of the tent, Abraham's sacrifice of Isaac, and the servants waiting at the foot of a hill. Emphatic lights and shadows among the rocks and trees carry the eye upward and inward. The ass is foreshortened. In the fine modeling of the servants, parts of the anatomy are undraped. In the variety of gestures and flowing lines of the drapery and wings of the angels, we recall the angels of Amiens and Reims.[8]

Esau and Jacob

The Renaissance interest in the beauty of the human figure is shown in panel five with its seven phases of the story of Esau and Jacob. The action of Ghiberti's figures, however, is rather the correspondence of beautiful lines than a feeling for weight and mass. He portrays Esau not as a primitive man of the woods but as an Italian gentleman. Esau's pose reveals the graceful lines of his figure.

The group of women at the left is irrelevant to the story. The young woman whose back is toward us is, indeed, a masterpiece in grace of pose and drapery. But through this episode Ghiberti sacrificed truth of fact for his love for grace of line.[9]

The panel contains few figures. The larger part of the composition is given to the elaborate architecture with its receding arches and Corinthian pillars in the house of Isaac. The perspective is perfectly done, but with Fairfield we can ask whether it was justified.[10]

Joseph

This embellishment by rich architecture, and even to a higher degree, is also in the sixth panel: the story of Joseph. The architecture is palatial: arch upon arch, columns and pilasters, cornices, pediments and spandrels—typical Renaissance architecture.

There is rhythm in the graceful attitudes and action of the numerous figures, lifelike and animated yet pervaded by an air of dignity. Well has Ghiberti depicted human emotions in the episode of the finding of the silver cup in little Benjamin's sack.

Moses

This ability of portrayal of human emotions is also in evidence in the seventh panel: Moses upon Mount Sinai receiving the Ten Commandments. Some of the people are portrayed with eager, upturned faces and outstretched arms; joyfully they welcome the divine manifestation; some are bowed in awe and reverence. Here the angel group surrounding God in the heavens is more dynamic than in panel one.

The use of lines is very effective; diagonals and curves predominate: diagonals in the rocks, in the tops of the tents, the treetops, the bent arms and knees, the position of the trumpets and the two stone tablets; curves in the angel group, the circular tents, and the women's coiffures.

Joshua and Jericho

In the panoramic scene of Joshua crossing the Jordan and proceeding against Jericho (panel eight), Ghiberti again solves the problem of the presentation of architectural detail. The wall and its towers are crenelated. With the vividness of reality, we see the solemn yet triumpant tread of the people as they bear the memorial stones from the bed of the Jordan.

David and Goliath

Skill in the composition of many figures is observed in panel nine: David and Goliath. The foreground gives a sharp contrast between the agile child David and the cumbrous giant. The background with its crenelated wall of Jerusalem (the name is engraved on the wall) parallels that of panel eight. The two panels, eight and nine, might well have been placed at the same level on the doors. The juxtaposition would intensify their parallelism: triumphant armies, generals, horses, musicians—in the act of entering a mighty city. A strong contrast is in the middle foreground; panel eight: the numerous lowly fish swimming peacefully in the Jordan; panel nine: the slaying of the one giant warrior.

Solomon

In architectural splendor second only to the Joseph panel is the tenth panel: Solomon and the Queen of Sheba. Here again the problems of architectural details have been overcome: the vaulted roofs of the various parts of Solomon's palace, pilasters with Corinthian capitals, rectangular

---

Sister M. Immaculate is instructor in Latin and history at Notre Dame Academy in Toledo. She took her master's degree at Notre Dame University and her doctorate at Catholic University.

windows with pediments, flat roofs and cornices, recessed areas, blind arches—all typical of Renaissance palaces.

The story is but half told: Solomon is in all his glory; there is no foreshadowing of his downfall. We contemplate a scene of dignified tranquillity. The panel is a fine example of balance and proportion in composition. In the foreground we view two groups of the queen's traveling-escort; in the center, Solomon and the Queen with their attendants. The palace with its lofty central archway forms an effective symmetrical background. The graceful, richly attired figures add to the royal magnificence. The panel is a plethora of lines and curves both in the architecture, with its elements of Greek, Roman, and Gothic origin, and in the figures with turbans, veils, and flowing drapery supplying the curves, and the gestures of arms and legs, the diagonals and verticals.

Style of the Panels

In the contemplation of the ten panels, we realize that each scene has been executed with a charming diversity and picturesque freedom.

For the effect of deep perspective, Ghiberti multiplied the planes and created the illusion of receding planes. The foremost figures are virtually detached in the round. The profundity of relief separates the episodes brought together in their respective panels.

In his portrayal of the tragic, Ghiberti appeals to our sympathy and thus approaches the Greek artist in the subordination of the physically painful to some mental quality.

A number of the female figures in their calm simplicity and development of attitude approach the standard of Athenian perfection. They are not too elongated nor too vigorous.[11]

His desire for classical beauty fused with Gothic idealism. In lines of body and drapery, he effects the quintessence of Gothic grace. Some of his figures have a definite Gothic bend to the side.[12]

He is indebted to humanism. He exposes parts of the anatomy. Even when the garments have the ordinary Gothic amplitude, the human form is often clearly outlined beneath them. His nudes, however, lack the robust strength of Roman sculpture. Indeed, they breathe a feminine grace that is characteristic of his whole production. If the heads of the figures in the numerous episodes belong to types rather than individuals, he achieves adequate characterization by posture and movement.[13]

The Framework

In the framework surrounding the panels are upright niches, elaborately wrought and about sixteen inches in height at the sides of all the scenes. Each of these twenty niches contains a full-length figure in almost full relief. There is some uncertainty with regard to the personages which these figures are intended to represent. Eight bear scrolls, indicative of the prophet's mission. Shedd offers the following identification.[14]

Left	*Panel*	*Right*
Jonas	1.	Joshua bearing a shield
Joel (?)	2.	A sibyl
Amos	3.	Samson
Rachael (?)	4.	A prophet (?)
Daniel	5.	Jeremiah with a book, not a scroll
Deborah	6.	Isaiah
Miriam with a timbrel	7.	David (?)
Aaron the high priest	8.	Saul (?)
Judith with the head of Holofernes	9.	Ezekiel
A prophet	10.	A sibyl

In these figures, almost in the round, there is perhaps more trace of classicism than in those represented as actors in the historical scenes. Since Ghiberti was a collector of classical marbles and bronzes, he may have copied his nude figure of the mighty Samson from some classical Hercules.[15] The figures exhibit a marked individuality and diversity of characteristics.

In the niches of the transverse parts of the frame are four recumbent, symbolical figures. The upper one at the right may represent Adam and the curse of man's labor; the female opposite, Eve and the promise of peace.[16] The two lower figures have been identified as Noah and his wife;[17] the male, however, holds a scroll, a symbol of prophecy.

At the angles of each panel are circular frames about five inches in diameter. They contain heads in full relief, male and female, both young and old, with a variety of characteristics—twenty-four tiny busts all told.

On the inner border of the left wing, be-

tween the third and fourth panel, is the portrait, rather the bust, of Ghiberti at the age of about seventy.[18] It is unidealized; Ghiberti is bald. The inspired goldsmith who was the first artist to write autobiography has also given us a lifelike portrait of himself. After the lapse of five centuries, his strong lineaments still look upon the visitor to San Giovanni's Baptistery. He set his hieroglyphic autograph in a worthy environment.

Between the niches and the heads are ornaments of great beauty and richness but not obtrusive nor detracting from the chief interest—the figures themselves.

To Ghiberti, nature and art were interwoven.[19] In the outermost borders on the doorcase and cornice, a decorative pattern of festoons of flowers, foliage, and fruits, also birds and small animals, breathes the true Renaissance spirit, humanistic, delighting in realism and in technique for its own sake. The flora and fauna garland extends from the two vases at the base of the border; the interwoven scrolls at the sides give an effect of Greek columns.

Ghiberti raised flowers and foliage from the status of conventions to become essentials in art decoration.[20] The fauna is articulated with complete assurance and introduced with real sympathy.[21] Study in particular the quail, the partridge, the chaffinch, the eagle, the owl, the squirrel. The flora and fauna are of Gothic derivation. However, they sacrifice the partial conventionalization that the best Gothic artists deemed suitable to the rigidity of architecture for botanical and zoological accuracy stemming from the revival of scientific interest.[22]

The jambs are adorned with bas-relief shaped with the master's touch, and even the threshold is likewise ornamented.[23]

In fine, after contemplating Ghiberti's East Doors, we can accept his own appraisal of his masterpiece: "This is the most outstanding of my works and I laboured at it with the utmost ardour and technical attainment, completing it with all possible artistry, sense of proportion and knowledge of art."[24]

Not until 1452 were the East Doors finished and gilded. At Easter in that year they were consecrated. The whole work had taken twenty-seven years, but it was often interrupted. With all these interruptions the completed work does not show any break of style.[25] When gilded, the reliefs produced in their scintillating movement an effect of great elegance. Ghiberti's patrons were enthused by the shining glitter that brought out every minute detail, every plane and half-plane. By the recent cleaning, the reliefs can now be seen in all the glory of their original gilding.[26]

To the Americans who did not visit Florence this Easter, Carnegie Institute offers a study of Ghiberti's East Doors in the replica housed in its Hall of Architecture.[27]

[The bronze doors of the Baptistry in Florence were taken down at the beginning of World War II for safety and stored. It was known that Ghiberti touched up the bronze of the East Doors with gold, but it was formerly believed that the gold leaf had rubbed off. When they were set up again in 1946, it was found that the original gilt was intact beneath the patina and dirt of five centuries. Accordingly a bronze caster, Bruno Bearzi, restored the doors, using chemical solvents which revealed the splendor that dazzled Florentines some five hundred years ago. The traveler fortunate enough to visit Florence the past few years thus has been able to enjoy them in their pristine brilliance.]

REFERENCES

[1] Edmond-René Labande, *Florence*, translated and adapted by Janet Hamilton (New York, London, 1951) p. 53.

[2] *Ibid.*, p. 54.

[3] Katharine Gibson, *The Goldsmith of Florence* (New York, 1936), pp. 78 f.

[4] Cf. Chandler Rathfon Post, *A History of European and American Sculpture from the Early Christian Period to the Present Day*, I (Cambridge, Mass., 1921), 169.

[5] Otho Pearre Fairfield, *The Italian Renaissance in Art* (New York, 1928), p. 79.

[6] Julia A. Shedd, *The Ghiberti Gates* (Boston, 1879), p. 45.

[7] See Fairfield, *op. cit.*, p. 81.

[8] Helen Gardner (*Art Through the Ages*, 3rd ed., New York, 1948, p. 452) observes that by a comparison of this panel and Donatello's *Herod's Feast* one realizes how sculptural is Donatello's conception in contrast to the pictorial quality in Ghiberti's work.

[9] Fairfield, *op. cit.*, p. 85.

[10] *Ibid.*, p. 84.

[11] See Hyppolite Taine quoted in Shedd, *op. cit.*, p 45.

[12] Post, *op. cit.*, p. 168.

[13] *Ibid.*, p. 168.

[14] *Op. cit.*, pp. 51-70.

[15] Gardner, *op. cit.*, p. 451.

[16] Shedd, *op. cit.*, p. 71.

[17] Unsigned article, "Ghiberti's Gates of Paradise," *Carnegie Magazine*, VI (1932), 107.

[18] See Goldscheider, *op. cit.*, Plate 1, n.; panel 7, upper right angle.
[19] Cf. Lord Balcarres (David A.E.L. Crawford), *The Evolution of Italian Sculpture* (London, 1919), p. 264.
[20] *Ibid.*, p. 226.
[21] *Ibid.*, p. 267.
[22] Post, *op. cit.*, p. 167.
[23] Goldscheider, *op. cit.*, p. 21: paragraph 18 of *Ghiberti's Autobiography*.
[24] *Ibid.*, English translation.
[25] *Ibid.*, p. 142, n., Plate 45.
[26] *Ibid.*, p. 143, n., Plate 69; Labande, *op. cit.*, p. 54.
[27] Shedd (*op. cit.*, published in 1879, p. 73) gives a list of museums in the United States possessing casts; the present writer has not vertified the list.

MUSEUM SUMMER PLANS

[*Continued from page 193*]

where he will look for fossils representing the late Devonian and early Mississippian periods.

As this issue goes to press, John A. Dorr, Jr. leaves for Wyoming to resume his stratigraphic and fossil studies in the Hoback Canyon. On the tenth of June, J. LeRoy Kay will go to the Uinta Basin in Utah to study Green River oil shales, and early in July will begin work on the Miocene lake beds near Bozeman, Montana. The two will join forces later in July to work along the North and South Thompson rivers in British Columbia. If any remains of the little "dawn horse" are found this season to supplement the fragments collected last summer, there will be rejoicing in Pittsburgh as well as out West.

Long-distance travel honors for the year go to chief staff artist Ottmar von Fuehrer, whose current summer visit to his native Austria is, theoretically at least, no busman's holiday. Since May 6 Mr. von Fuehrer has been taking a vacation from the preglacial world of long ago, in which he will again immerse himself when he returns next September to resume work on his 90-foot revolving mural for the new Hall of Fossil Mammals. —V. G.

OUR ENGINEERING HERITAGE

[*Continued from page 199*]

negie Institute of Technology and president of S.P.E.E., appointed a committee on engineering education after the war, and again H. P. Hammond was selected as chairman. The committee, reporting in 1944, found that the specific purposes are essentially those recommended in the 1940 report on Aims and Scope of Engineering Curricula. They advised that the humanistic-social stem should require a minimum of 20 per cent of the student's time and noted that unless instruction included the elements of practice, it would be in science rather than in engineering. Events had shown one major extension to be needed: a more positive indoctrination in civic and professional responsibilities.

From legendary times until today, no men essential to human progress have kept in better step with the vicissitudes of civilized progress than engineers and their teachers. At the close of World War II college enrollments were decimated—and a few years later their burdens were increased more than tenfold. Yet they have not only survived this torrent of change—they have periodically taken their bearings in the light that history and mastery of their profession gives them—and they have projected into the uncertain future, plans which have been realistic enough to make engineering a little better, and our standard of living a little higher through periods of prosperity, depression, and war. In learning to deal with the forces of Nature—to get in step with her and bend her laws to the material and economic welfare of all mankind—the engineer learns to deal realistically with things as they are; and he does not waste too many tears about things that might have been. Our engineering heritage is in large measure the realism and strength and courage that one must acquire if he is to work in the vanguard of inevitable change. In dealing with the caprice of Mother Nature the engineer has been pretty successful; in dealing with the cussedness of human nature he has limitless challenges and opportunities ahead of him.

Who can tell what changes lie ahead? Engineers may study the "laws of politics" in days to come, and harness the overgrown giant of governing machinery which has become America's master, rather than her servant. Would engineers bungle that job more than politicians have done? Time only can answer that. But I would ask one rhetorical question in conclusion: could politicians have done as well in bending the forces of nature to man's convenience and use as engineers have done? The job of harnessing politics for the use and convenience of man is yet to be done—and we'd better begin now!

From far Places

THE FAN has fluttered artfully in woman's hand since she first picked up a cluster of feathers to wave in front of her face. From that day on, she has combined cooling and coquetry with skill and grace.

• Many materials have been used in making fans. But few excel in subtlety and beauty the ivory ones of France. Ivory was an almost ideal medium. It could be peeled wafer thin, carved, pierced, and bent. Its milky translucence appealed to women. And its lightness made a perfect foil for breeze and banter.

• This genius for combining the practical with the aesthetic, innate in women, expresses itself freely at today's table. Delicacies like the 57 Varieties provide her with epicure fare at a convenience.

H. J. HEINZ COMPANY (57)

Heinz Collection . . . Carnegie Institute

BOARD OF TRUSTEES

The following thirty-six trustees serve both Carnegie Institute and Carnegie Institute of Technology, and eighteen of them (starred) are also trustees of Carnegie Library of Pittsburgh. Their committee memberships are indicated.

EDWARD DUFF BALKEN
Fine Arts.

JAMES H. BEAL
Reed, Smith, Shaw & McClay. *Fine Arts.*

FREDERICK G. BLACKBURN
Vice President, Mellon National Bank and Trust Company. *Museum, Tech, Auditing, Advisory.*

WALTER J. BLENKO
Blenko, Hoopes, Leonard & Glenn. *Chairman, Executive Committee, Carnegie Institute of Technology. Finance.*

*JAMES M. BOVARD
President, Carnegie Library, Carnegie Institute; Chairman of the Board, Carnegie Institute of Technology.

*ARTHUR E. BRAUN
Advisory Committee, Mellon National Bank and Trust Company. *Buildings and Grounds.*

*SAMUEL B. CASEY
Vice President, John F. Casey Company. *Buildings and Grounds.*

*J. ROY DICKIE
President, Board of Public Education. *Library, Museum.*

*CHARLES F. DINAN
City Council. *Pension.*

HOWARD N. EAVENSON
Mining Engineer. *Museum, Pension, Tech, Fine Arts, Advisory.*

*PATRICK T. FAGAN
City Council. *Music Hall.*

*THOMAS J. GALLAGHER
President, City Council. *Buildings and Grounds.*

H. J. HEINZ II
President, H. J. Heinz Company. *Museum, Pension.*

*JAMES F. HILLMAN
President, Harmon Creek Coal Corporation. *Fine Arts, Library.*

ROY A. HUNT
Chairman, Executive Committee, Aluminum Company of America. *Fine Arts, Tech, Finance, Advisory.*

JOHN F. LABOON
Consulting Engineer. Chairman of the Board, Allegheny County Sanitary Authority. *Tech, Music Hall.*

*DAVID L. LAWRENCE
Mayor of Pittsburgh. *Fine Arts.*

RICHARD K. MELLON
Chairman of the Board, Mellon National Bank and Trust Company *Museum, Advisory.*

AUGUSTUS K. OLIVER
Vice President, Commerce Building Company. *Finance, Pension, Tech, Advisory.*

*WILLIAM R. OLIVER
Assistant Treasurer, Jones & Laughlin Steel Corporation. *Fine Arts, Museum.*

*THOMAS L. ORR
Vice President, Mellon National Bank and Trust Company. *Fine Arts, Tech, Finance, Advisory.*

JOHN LESTER PERRY
Music Hall.

*GWILYM A. PRICE
President, Westinghouse Electric Corporation. *Tech.*

JAMES C. REA
Vice President, Oliver Iron and Steel Corporation. *Museum, Music Hall, Pension, Finance.*

*WILLIAM M. ROBINSON
Reed, Smith, Shaw & McClay. *Finance.*

*BENNETT RODGERS
City Council. *Library, Museum.*

CHARLES J. ROSENBLOOM
President, Rosenbloom Finance Corporation. *Fine Arts.*

FREDERIC SCHAEFER
President, Schaefer Equipment Company. *Museum, Fine Arts.*

*EMANUEL F. SCHIFANO
City Council. *Museum.*

SIDNEY A. SWENSRUD
President, Gulf Oil Corporation. *Tech.*

*JOHN F. WALTON, JR.
T. Mellon and Sons. *Buildings and Grounds, Museum.*

JOHN C. WARNER
President, Carnegie Institute of Technology. *Tech.*

*FREDERIC G. WEIR
City Council. *Buildings and Grounds, Tech, Advisory.*

WILLIAM P. WITHEROW
Blaw-Knox Company. *Music Hall, Tech, Advisory.*

*A. L. WOLK
City Council. *Auditing, Fine Arts, Library, Advisory.*

LAWRENCE C. WOODS, JR.
Manager, Woods Agency, Equitable Life Assurance Society of United States. *Museum.*

CARNEGIE PRESS

CARNEGIE MAGAZINE
4400 Forbes Street
Pittsburgh 13, Pa.

University of Michigan,
General Library,
Ann Arbor, Michigan.

Section 34.66 P.L.& R.
U.S. POSTAGE PAID
Pittsburgh, Pa.
Permit No. 307

Form 3547 Requested